

PRODUCT MANUAL

NAUTICAST W1

Serial to WiFiServer

Product No. 300 2001

Product No. 300 2002 (incl. 100-230VAC power adapter)



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GENERAL WARNINGS

The Nauticast W1 is CE and FCC certified, the certifications can be found in the appendix of this document. For use outside of the territories of the EU or the US, please consult your local authorities. For more information you may contact support@nauticast.com.

LIMITED WARRANTY

This product is warranted against factory defects in material and workmanship for a period of 24 months from the date of purchase. During the warranty period Nauticast GmbH will repair or at its option, replace the product at no cost to the buyer provided that a return authorization is obtained from Nauticast GmbH, Lützowgasse 12-14 / 3. OG, 1140 Vienna, Austria (see chapter 6 Contact & Support information).

This warranty does not apply if the product has been damaged by accident or misuse, or as a result of service or modification by unauthorized service personnel.

Warranty and certification void if device is opened.

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1 Installation

1.1 The contents of this box

Before proceeding with the installation of the Nauticast W1 please check the contents of the box, which include:

- Nauticast W1 device
- Power Cable
- WiFi Antenna
- Documentation and Software USB memory containing:
 - Nauticast W1Quick Installation Guide
 - Nauticast W1 Product Manual
 - Nauticast W1 Product Sheet
 - Link2AIS Setup (software for Windows)
 - Link2AIS User Guide
 - WiFi Module Utility (software for Windows)
 - + other Documentation and Information Material
- Optional: 100-240V AC power supply(included in p/n 300 2002)

1.2 Hardware setup

1.2.1 Attach the WiFi antenna

Screw the Wifi antenna into the connection thread.

1.2.2 Connect to power

- Power up the W1: connect the power cable to a 9-24V DC power source or the 100-230V AC power supply to a 100-230V AC plug. The connector at the other end of the cable needs to be connected to the W1 power socket. Alternatively there is a direct cable connection for a 2 wire power cable (9-24V DC). Please mind the polarity.

1.2.3 Serial Connection (optional)

- Optional: connect a device (like the Nauticast B2) to the serial interface either to RS232 or to RS422 (as marked on the device). Only one of the 2 ports can be used at the same time.

1.2.3.1 RS232 Connection

The Nauticast W1 has a standard RS232 9pin D-Sub socket, where you can connect any standard RS232 cable. Interface speeds up to 115200 Baud are supported.

1.2.3.2 RS422/RS485 Connection

To connect a RS422/RS485 device no standard plugs are defined but 4 terminal sockets are used. RS422/RS485 uses 2 wires to transmit information and 2 wires to receive. These are often referred to as TX A (or TX -) and TX B (or TX +) for the transmitting wires and RX A (or RX -) and RX B (or RX +) for the receiving wires. The transmitting wires of one device need to be connected to the receiving pins of a second device and vice versa like in the following table:

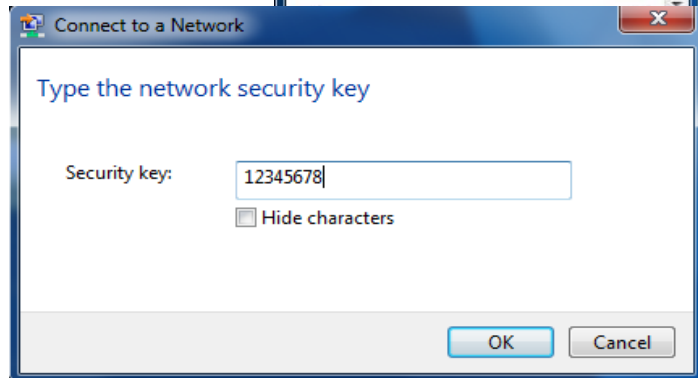
Device 1 (e.g. Nauticast W1)	Device 2 (e.g. Nauticast B2)
RX A (-)	TX A (-), green
RX B (+)	TX B (+), yellow
TX A (-)	RX A (-), grey
TX B (+)	RX B (+), white

1.3 Establish WiFi connection

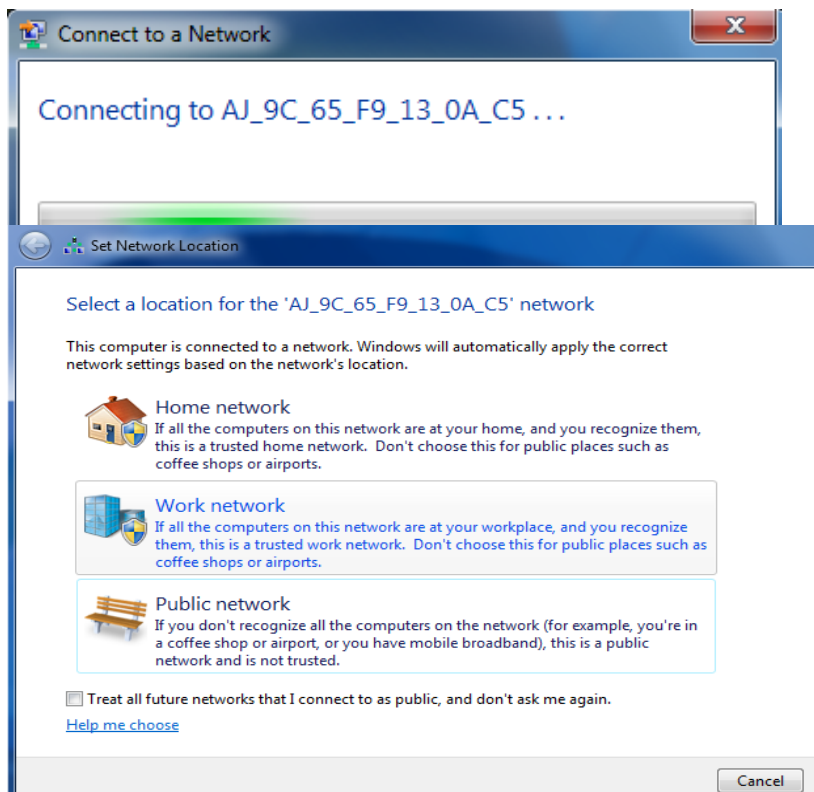
The exhibits in this manual refer to a PC running a Windows operating system. If you use a different device the appearance may differ slightly.

The Nauticast W1 will by default start as a Soft AP (Software Access Point) and is visible to any WiFi capable device. This may be a PC, Notebook, Smartphone, Tablet or any other device with WiFi and a web browser. To connect please follow these steps:

1. The Nauticast W1 will be visible when searching for WiFi networks. The network name (SSID) is similar to **AJ_9C_65_F9_13_0A_C5** as can be seen in the picture to the right.
Note: The SSID is derived from the MAC address, unique to each W1 and can be found on the bottom label.
2. Search for this SSID in the network settings of your device. Click "Connect".
3. When asked to enter the network security key enter the default password **12345678**. On a Windows operating system it is important to choose "Home network" or "Work network" to avoid problems with the Windows Firewall.



Your system will look like in the exhibits underneath.

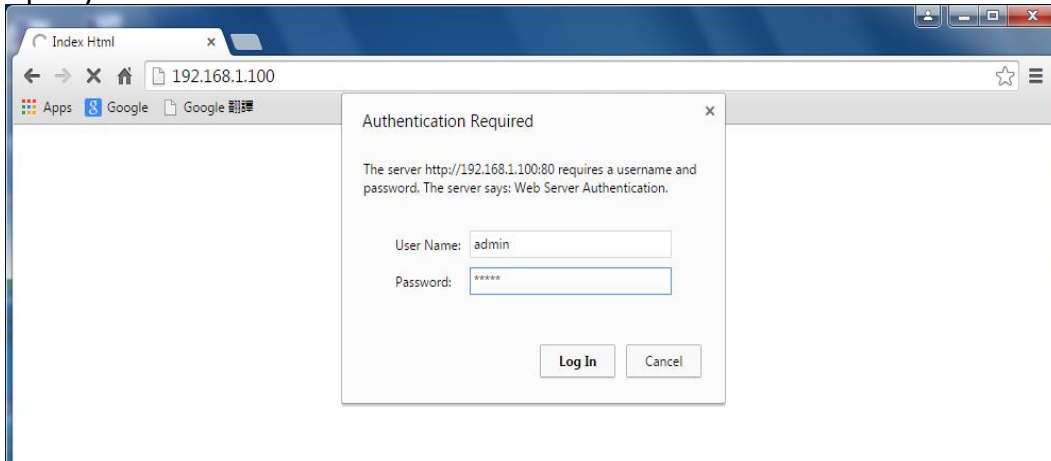


You have now successfully established connection to the Nauticast W1.

1.4 Open W1 configuration interface

The configuration interface is independent of the device used to connect to the Nauticast W1.

1. Open your web browser and enter the IP address **192.168.1.100** in the address field.



Now you need to enter the password to access the configuration. The default User Name is "admin" with the Password "admin".

2. There are three main menus containing all configuration options.
 - a. **System:** Network Status, Password Change and Serial Data Settings.
 - b. **Network:** Network Mode and configuration.
 - c. **Serial Wi-Fi:** TCP/UDP Settings.



The options available in these three menus will be presented in detail in the following chapters. Whenever you are finished with the changes to the fields in one menu, press **Save** or **Save and Reboot**. Otherwise your changes will be lost if you switch to another menu. At the end of all changes select **Save and Reboot** for the changes to come into effect.

2 W1 configuration in detail

2.1 System Options

2.1.1 Status

The **Status** section will display basic network settings. Changes to these parameters are not possible in the **System**, but only in the **Network** menu.

2.1.2 System

Allows you to change the admin password, device name and description.

2.1.3 NTP

An NTP Server to retrieve current time can be entered, there are no changes necessary for a normal installation.

2.1.4 Serial Interface options

Note: The Nauticast W1 can only use one serial port at a time, therefore either RS232 or RS422/RS485. To ensure proper operation always only connect one or the other.

Make sure the serial device has a hardware connection to the Nauticast W1 according to section 1.2.3 Serial Connection (optional).

Open the "System" web page and scroll down to the "**Serial**" section to change the settings for the serial interface.

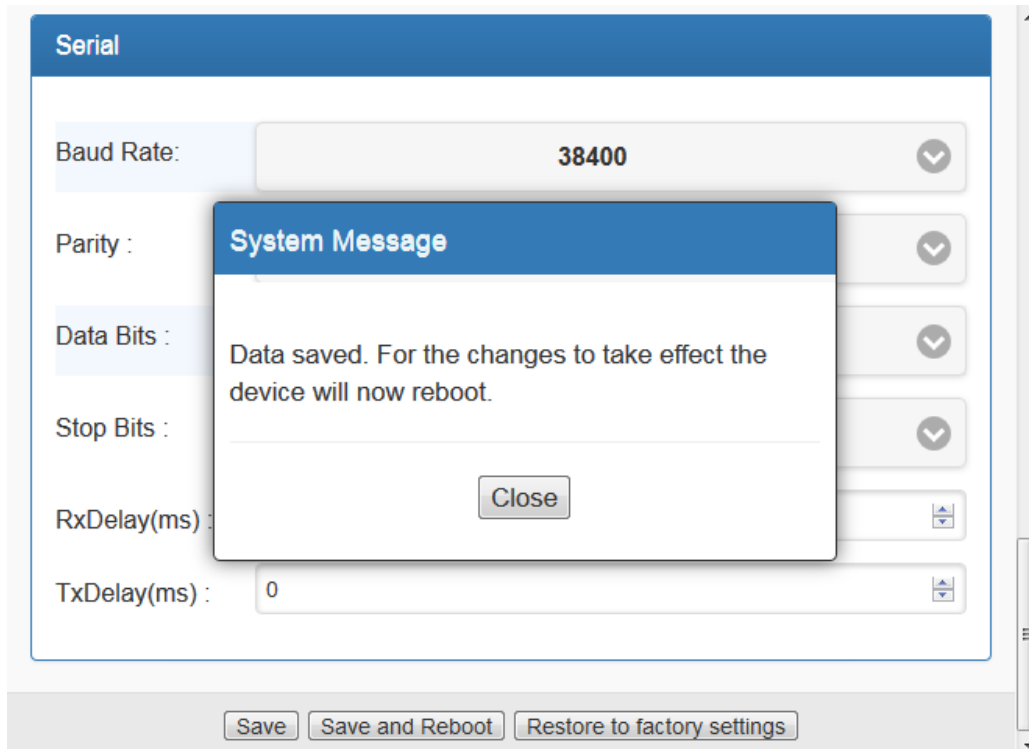
The screenshot shows the 'Serial' configuration page. The fields are as follows:

Field	Value
Baud Rate:	115200
Parity :	None
Data Bits :	8
Stop Bits :	1
RxDelay(ms) :	0
TxDelay(ms) :	0

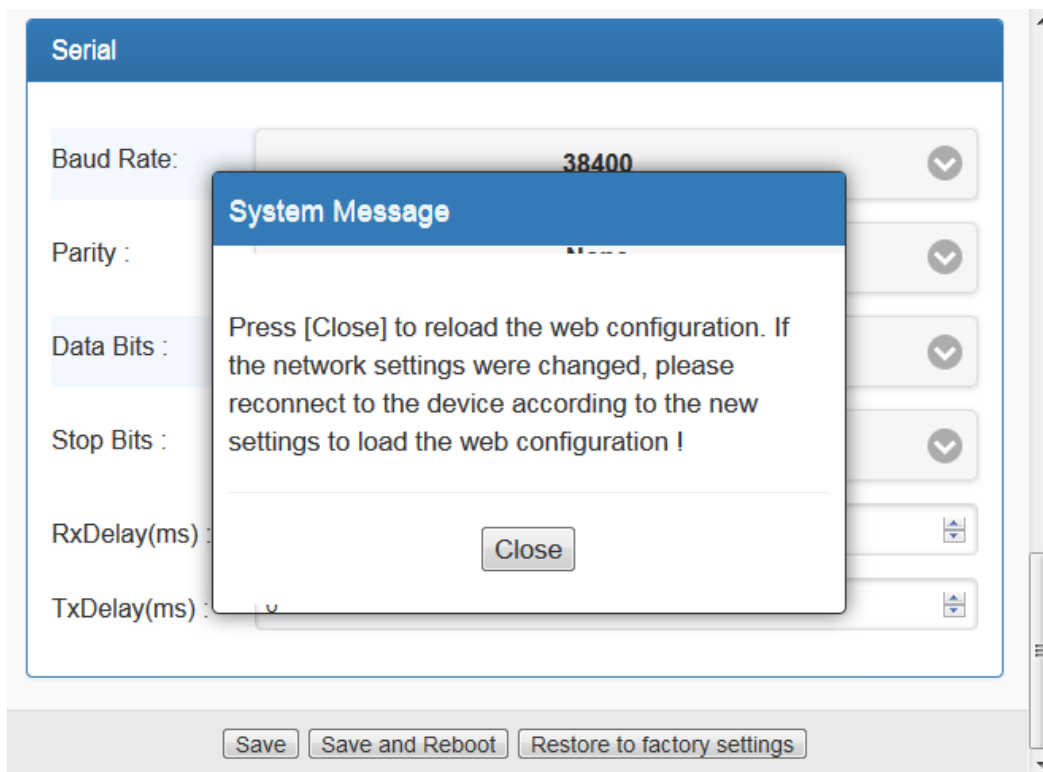
Buttons at the bottom: Save, Save and Reboot, Restore to factory settings.

1. Check the serial connection settings of your device. Normally only the Baud rate (interface speed) needs to be changed (applies to both RS232 and RS422/RS485).
Note: AIS marine equipment uses 38400 per default, other marine equipment uses 9600 Baud. Only on RS232 the Nauticast B2 uses 115200 Baud. The exhibit above shows the correct settings for a Nauticast B2 via RS232 with 115200 Baud whilst a connection of the Nauticast B2 via RS422 requires a Baud rate of 38400.
2. Connect your device to one of the serial interfaces on the Nauticast W1.
3. Edit the settings to match the settings for the serial interface of the connected device.

4. Press "Save and Reboot" to save the values and let the device reboot.



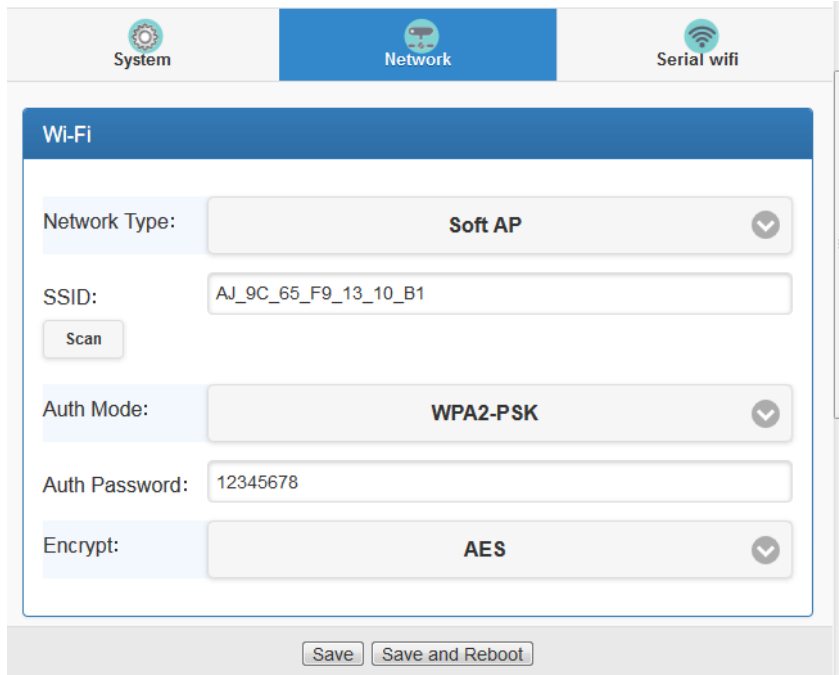
5. A system message will pop up, press "Close", the Nauticast W1 will now reboot.
6. After the reboot another pop up will show, allowing you to reload the web interface with the updated settings.



2.2 Network Options

2.2.1 Soft AP (Standalone Server Mode as Access Point)

If you have no existing network or want to keep the network independent, please choose Soft AP as Network Type.



The screenshot shows the 'Network' configuration page with the 'Wi-Fi' section active. The 'Network Type' is set to 'Soft AP'. The 'SSID' is 'AJ_9C_65_F9_13_10_B1'. The 'Auth Mode' is 'WPA2-PSK' and the 'Auth Password' is '12345678'. The 'Encrypt' option is set to 'AES'. At the bottom, there are 'Save' and 'Save and Reboot' buttons.

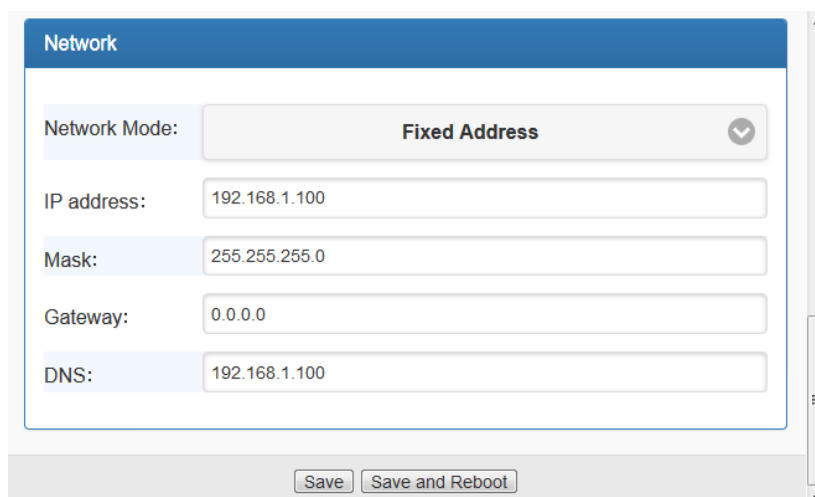
1. Open the "Network Setup" page.
2. Enter your desired SSID (network name, e.g. "MyNet").
3. Choose the network encryption type in "Auth Mode".
4. Enter your desired Authentication Password.
5. Press "Save and Reboot" to save the values and let the device reboot with them.
6. After the reboot you will be able to connect to your newly configured network using the defined password.

Optional settings, not necessary for standard configuration:

IP address of the device (for web interface and TCP data stream), Subnet Mask, Standard Gateway and DNS address, there are no changes necessary for normal operation.

2.2.2 Infrastructure Network Type

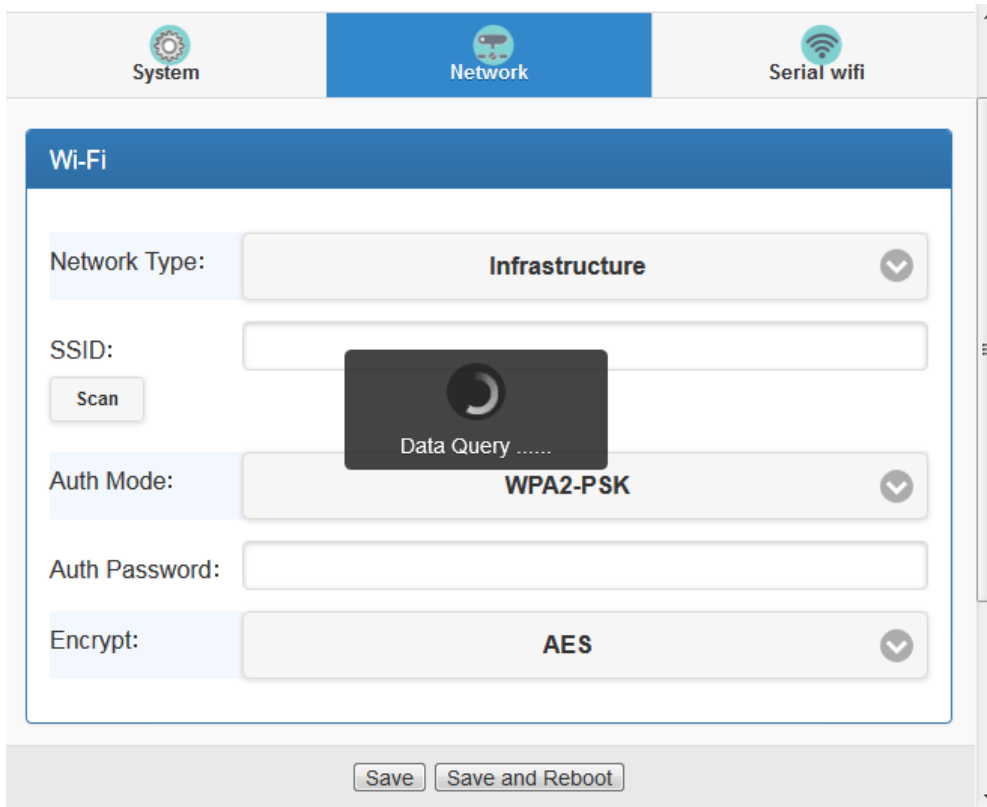
If you have an existing wireless network and want to integrate the device (and the serial data



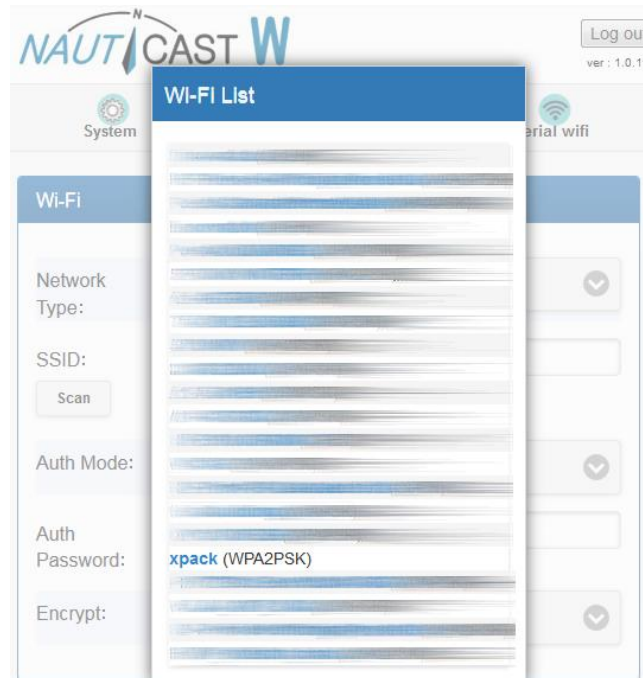
The screenshot shows the 'Network' configuration page with the 'Infrastructure Network' section active. The 'Network Mode' is set to 'Fixed Address'. The 'IP address' is '192.168.1.100', the 'Mask' is '255.255.255.0', the 'Gateway' is '0.0.0.0', and the 'DNS' is '192.168.1.100'. At the bottom, there are 'Save' and 'Save and Reboot' buttons.

stream), please choose this mode.

1. Open the "Network Setup" page and choose Network Type "Infrastructure". Then press "Scan" to search for your local wireless network.



2. Wait until the list is shown and choose your network.



3. Enter the password for your network, make sure to enter it correctly. Otherwise the device can't connect and you will need to reset the Nauticast W1.

The screenshot shows the Wi-Fi configuration page. The 'Network Type' is set to 'Infrastructure'. The 'SSID' is 'xpack'. The 'Auth Mode' is 'WPA2-PSK'. The 'Auth Password' field is empty. The 'Encrypt' option is set to 'AES'. There are 'Save' and 'Save and Reboot' buttons at the bottom.

4. Choose the "Network Mode". Normally "DHCP" is recommended, in this case the existing network will assign an IP address to the W1. "Fixed Address" would force the W1 to use the fixed IP address. Depending on your network, this may lead to address conflicts.
5. Press "Save and Reboot" to save your entries and let the device reboot.
6. After the reboot the device will connect to your network. To access the data stream or the configuration interface, you will need to use the new IP address. You can find the assigned IP address by checking the device list of your router/network or by using the "WiFi Module Utility" supplied on the W1 data card. You should create a Lease for the device on this IP address, then every time it connects it uses the same IP address.
7. If you get no access to the Nauticast W1, you can always do a hard reset to factory settings with the small button beneath the WiFi antenna (press for 5 sec).

2.3 Serial WiFi Options (Data transmission mode)

In the Serial WiFi menu you can choose between TCP and UDP as the data transmission mode. TCP will establish a 1:1 connection from the W1 to just one counterparty. The data stream is monitored and secured against data losses.

UDP will allow you to stream data to multiple recipients (1:n) in one direction. Use this mode if you want to stream data to multiple devices like a Notebook and a mobile phone. However there is no protection against data losses and no information can be sent from the network to the Nauticast W1 and the serial device.

2.3.1 TCP Server (default)

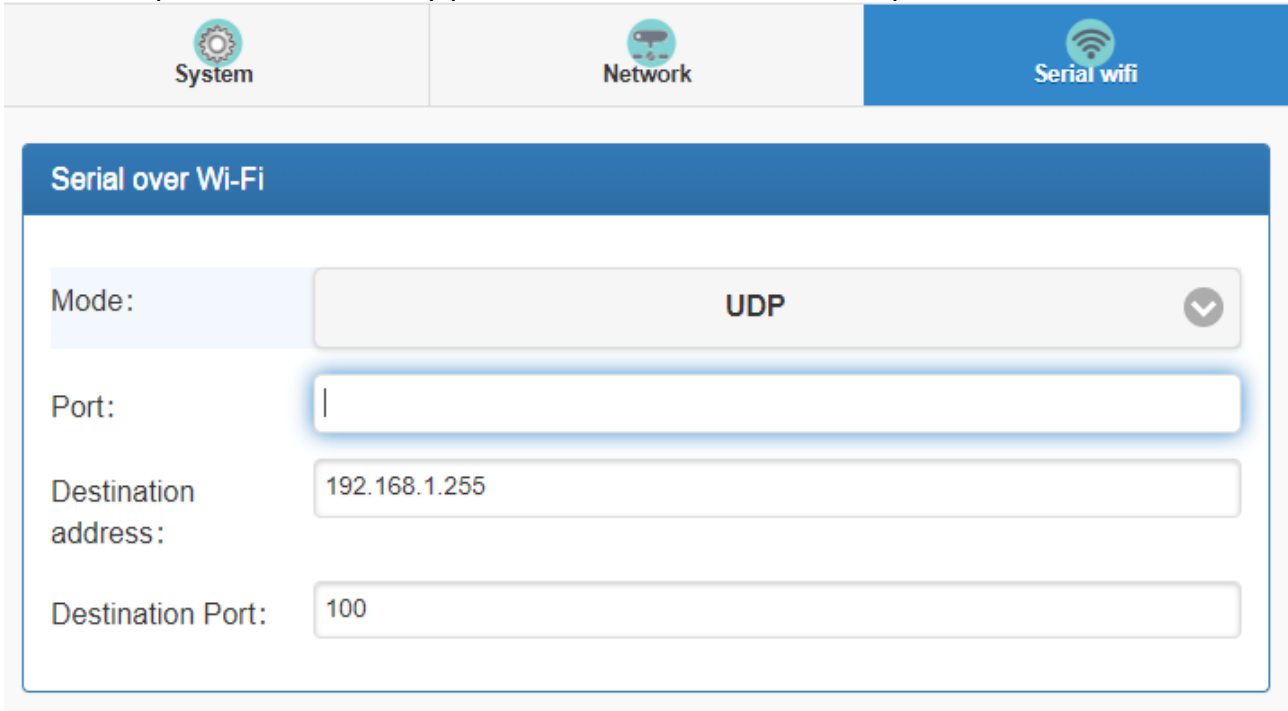
Most applications use this mode, where the Nauticast W1 acts as a server for the data stream that can be opened by just one client device or application.

To configure a connected Nauticast B2 with Link2AIS, this mode must be used. For regular

operation you may revert to UDP.

2.3.2 UDP Mode

This mode allows to broadcast the data stream into your network to connect several clients. The disadvantage is that no information can be sent from the client to the Nauticast W1. As a result the initial configuration of the Nauticast B2 via Link2AIS will not be possible. For setting the UDP mode correctly the destination address must be set to the network's broadcast address, the destination port can be set to any port between 1 and 65.535. Example:



The screenshot shows the configuration interface for the Nauticast W1 device. At the top, there are three tabs: 'System', 'Network', and 'Serial wifi'. The 'Serial wifi' tab is selected and highlighted in blue. Below the tabs, there is a section titled 'Serial over Wi-Fi'. This section contains four configuration fields: 'Mode' is set to 'UDP' (indicated by a dropdown arrow), 'Port' is an empty text input field, 'Destination address' is set to '192.168.1.255', and 'Destination Port' is set to '100'.

Clients like Link2AIS then will receive the serial data stream on port 100.

2.3.3 TCP Client

If you have a TCP Server running, waiting for a data stream, the Nauticast W1 can also act as a client and open the data stream. Please note this mode is usually not used, only activate it if you have basic knowledge in TCP streams and are sure this is the correct mode.

3 Connect your Nauticast B2

3.1 Nauticast B2 Data Cable

For the connection of the Nauticast B2 to the Nauticast W1 you can use either data cable P/N 3001004 or P/N 3001012. Connect the RS232 plug to the Nauticast W1. The complete serial interface settings are already set up correctly for this use case.

To use the RS422 interface, please see the instructions in section 1.2.3.2 RS422/RS485 Connection. Please be aware, the RS422 interface works with 38400 Baud, therefore you need to change this in the settings of the Nauticast W1, see section 2.1.4 Serial Interface options **Error! Reference source not found.**for more details. We recommend using the RS232 interface on first installation, as it allows for a simpler connection. After setup both options will work equally well.

3.2 Link2AIS

If you're using a PC to connect, you can use the Link2AIS application (included in the USB data card that comes with the Nauticast B2 or the Nauticast W1) out of the box. Just use the following settings in the menu "System Settings – Connection":

Data Source: TCP Connection

TCP/UDP Settings
IP: 192.168.1.100
PORT: 100

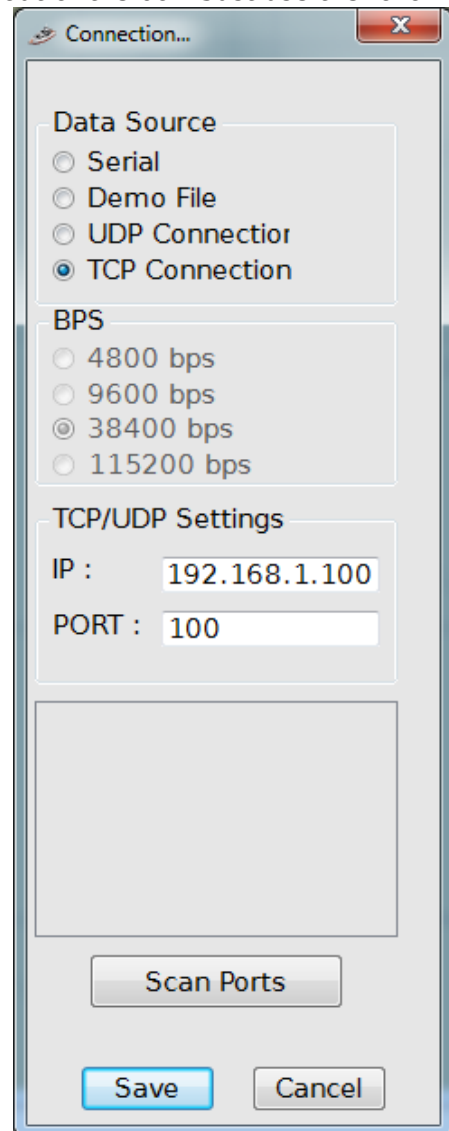
For a UDP connection please choose:
Data Source: UDP Connection

TCP/UDP Settings
PORT: 100

Note: If you have set the Network Type to "Infrastructure" and have the IP address assigned with DHCP, the IP-address will differ. See 2.2.2 Infrastructure Network Type for more details.

Click "Save" and the connection will be established.

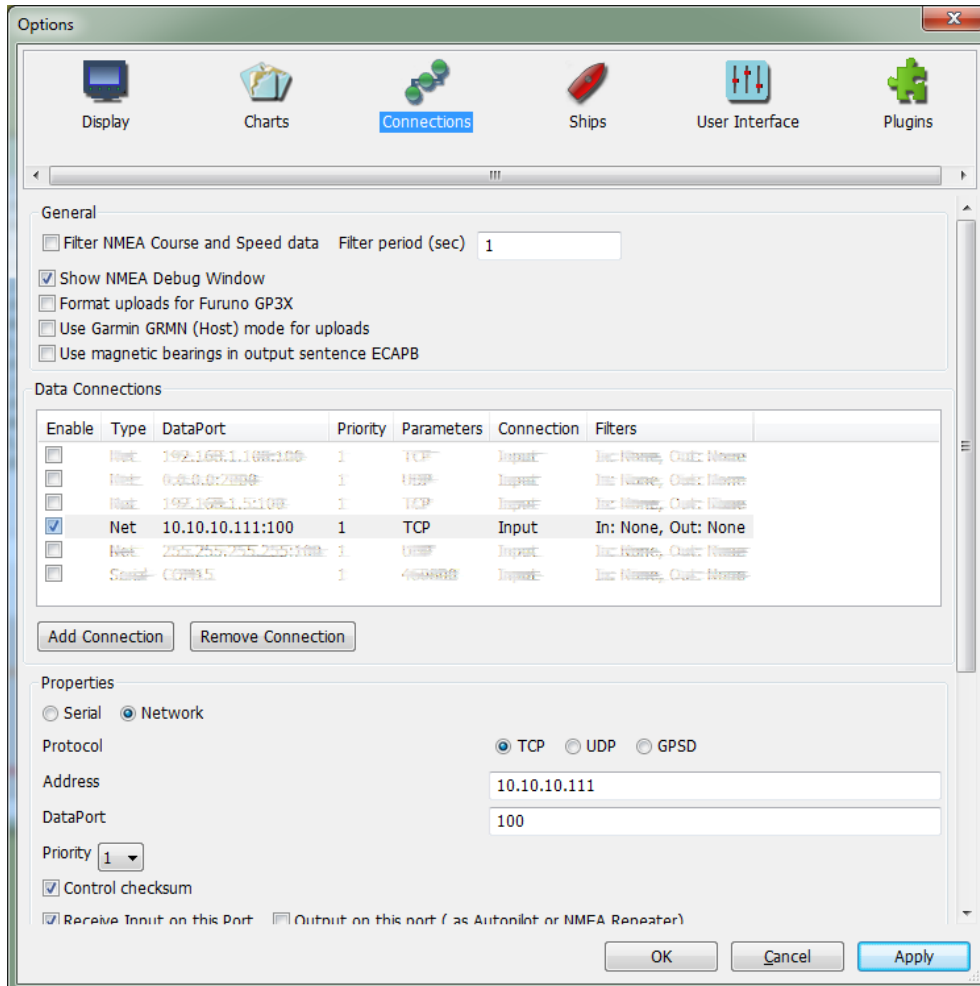
To ensure a proper connection, you can open the menu "View – Monitor Interface", where you can see the communication in clear text. For analytical purposes the data stream may also be saved to a file.



3.3 OpenCPN

If you are using the OpenCPN application, you can easily configure it to use the Nauticast W1 as your data source as can be seen in the picture below.

Note: In this exhibit the IP address was assigned to the W1 by the router. By default the IP is set to 192.168.1.100 and default Port is 100.



4 Maintenance

WARNING: Unauthorized opening of the Nauticast W1 (case) will invalidate the warranty!

CAUTION: Avoid using chemical solvents to clean the Nauticast W1. Make sure no liquid enters the device. To clean, wipe with a damp cloth.

NOTE: The Nauticast W1 contains no user serviceable parts.

If you are experiencing unexpected behaviour or malfunctioning of the Nauticast W1, please follow the hints in chapter 5 Troubleshooting.

5 Troubleshooting

LED behaviour

SYS: Lits up green when connected to a power source.

WiFi: Flashes red during startup and lits up constantly red when the WiFi is ready.

Rx: Flashes green when the Nauticast W1 is receiving data from a connected serial device.

Tx: Flashes red when the Nauticast W1 is transmitting data to a connected serial device.

Reset the device

To reset the device, press the reset button underneath the antenna for 5 sec.

How can I find the IP-address of the W1?

The default IP address is 192.168.1.100. If you have changed the device into Infrastructure Mode to connect to an existing network, the IP addresses of the devices in this network can be looked up in the router settings. In either case you can use the "WiFi Module Utility" supplied on the data card to find your device in the network.

Cannot connect a second device while a first one is working

Make sure the transmission mode is set to UDP. See 2.3 Serial WiFi Options (Data transmission mode).

Device does not connect to existing network

Press the reset button beneath the WiFi antenna for 5 seconds and enter the settings for your network again. Make sure the password is correct. After the reboot wait for 1 minute and check if the device shows up on the settings page of your router, managing the network. You can also use the "WiFi Module Utility" supplied on the data card to find your device in the network.

Cannot open stream

Please make sure the device settings for the stream align with the stream you try to open. Default is IP address 192.168.1.100 and Port 100.

No data visible in stream

Make sure the connected device is transmitting data (RX LED will flash green if it receives data). Check the IP address. Try to reopen the stream and restarting the device.

Data is not correct / unreadable

Please make sure the interface speed (Baud rate) on the Nauticast W1 is set correctly. The Nauticast B2 uses 115200 Baud as a default for RS232 as does the Nauticast W1. AIS equipment connected via RS422 use 38400 Baud as default, whilst other marine devices are set to 9600 Baud. The interface speed needs to be set accordingly to allow proper operation.

How can I test the data transmission?

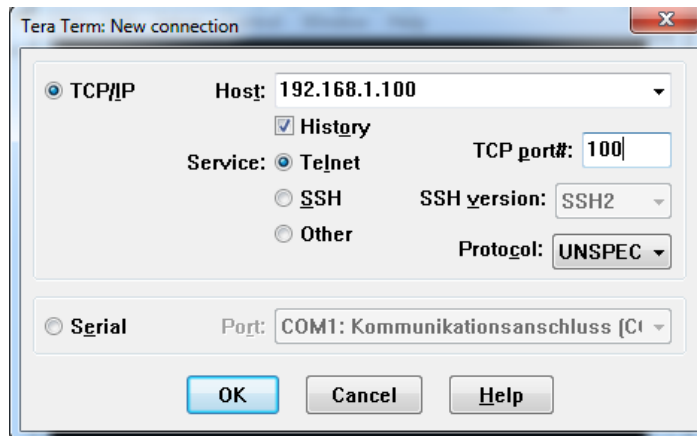
You can check the data stream with the monitor interface of Link2AIS. See 3.2 Link2AIS. Alternatively you can use a variety of terminal programs. A choice of popular programs is:

- Tera Term (Windows)
- PuTTY (Windows)
- TCP / UDP Terminal (Android)

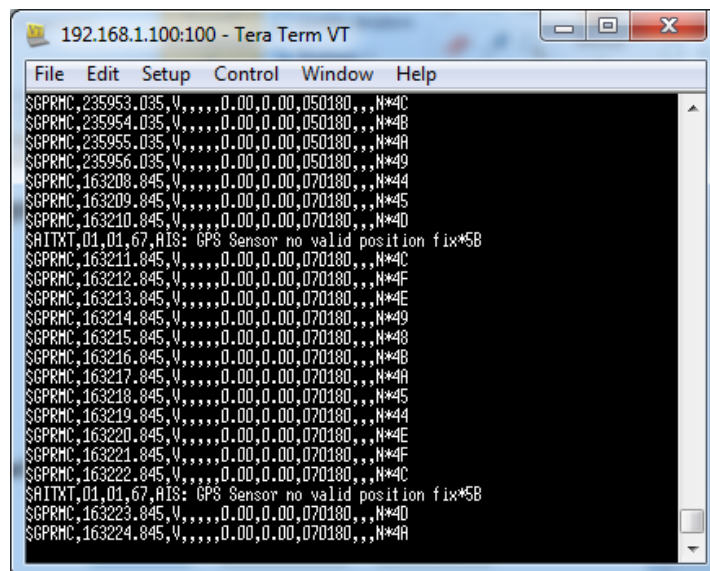
As an example you can see how to connect with the Tera Term application for Windows:

1. Start the terminal program and enter the correct IP address.
2. Choose "Telnet" mode
3. Enter the IP address for your Nauticast W1 (default in picture)
4. Enter the chosen TCP Port (default in picture)

Note: This works only when using the TCP Server network mode.



5. Click "OK" to open the data stream. On Tera Term you will see a data stream as in the picture below.



If the sentences are incomplete or do not show as expected, please first make sure the entered Baud rate is correct for both the Nauticast W1 and the serial device..

6 Contact & Support information

Contact your local dealer for Nauticast W1 support or see our website www.nauticast.com for help and latest updates.

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Mail: support@nauticast.com
Web: www.nauticast.com

7 Appendix

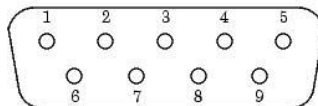
APPENDIX A – Pin Layout

Power supply:

Name	Nauticast W1	Description
Ground	-	Connect to ground, 0VDC
24V / 12V DC	+	Connect to positive voltage 12VDC or 24VDC

RS232:

The pin assignment scheme for a 9-pin **male** connector on a DTE is as follows:



Name	Nauticast W1	Description
2	RX	Connect to TX of other device
3	TX	Connect to RX of other device
5	GND	Connect to ground

RS422 / RS485:

Name	Nauticast W1	Description
Receive A / X	RX A (-) / X	Connect to TX A of other device
Receive B / X	RX B (+) / X	Connect to TX B of other device
Transmit A / Data -	TX A (-) / D -	Connect to RX A of other device / connect to Data -
Transmit B / Data +	TX B (+) / D +	Connect to RX B of other device / connect to Data +

APPENDIX B – CE Certificate of Compliance



Global Certification Corp.



Report No.: E611902-01

CERTIFICATE OF COMPLIANCE

Applicant : Nauticast GmbH
Address : Luetzowgasse 12-14, AT-1140 Vienna, Austria
EUT : Nauticast W1
Model No. : W1
Trade Name : Nauticast

Test Standards:
EN 301 489-1 V1.9.2
EN 301 489-17 V2.2.1

EMI : CLASS B
EN55022:2010

EMS :
EN55024:2010
EN61000-4-2:2009
EN61000-4-3:2006+A2:2010
EN61000-4-4:2012
EN61000-4-5:2006
EN61000-4-6:2009
EN61000-4-11:2004

According to the applicant's declaration this EUT is a Class A product,
and to be marketed in industrial environment only.

The above equipment was tested by Global Certification Corp. For compliance with the requirements set forth in the EUROPEAN COUNCIL Directive 2004/108/EC and the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested.

The test was carried out on Feb. 23, 2016 and this test report shall not be reproducing in part without written approval of Global Certification Corp.

Approved By:



Re- Issued Date: Aug. 11, 2016

APPENDIX C – FCC Equipment Authorization



Global Certification Corp.



Report No.:F611902-01

CERTIFICATE OF COMPLIANCE

For the following equipment :

Equipment Under Test : Nauticast W1

Model Name: W1

Trade Name: Nauticast

Applicant: Nauticast GmbH

Luetzowgasse 12-14, AT-1140 Vienna, Austria

Is here with confirmed to comply with the requirements set out in the FCC Rules and Regulations Part 15 Subpart B and CISPR PUB. 22 and the measurement procedures were according to ANSI C63.4-2009. The said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

FCC part 15 subpart B

Class A

The test was carried out on Feb. 23, 2016 at Global Certification Corp.

New Taipei City, Taiwan Dec. 05, 2016

(Place)

(Re-Issued Date)

(Signature)



For more information
and the latest updates visit us at

www.nauticast.com



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